

* #67
#31

key

Name _____ Date _____ Period _____

Algebra 1CD
Final Exam Review

Part 1 Solve the equation or inequality. Check your answers. Look for extraneous solutions.

$$\begin{array}{r} 1. 5x + 6 = 31 \\ -6 \quad -6 \\ \hline 5x = 25 \\ x = 5 \end{array}$$

$$\begin{array}{r} 2. 4x - 6 = 34 \\ +6 \quad +6 \\ \hline 4x = 40 \\ x = 10 \end{array}$$

$$\begin{array}{r} 3. -4y - 8y = 48 \\ -12y = 48 \\ y = -4 \end{array}$$

$$\begin{array}{r} 4. x + \frac{1}{3}x = 8 \\ \left(\frac{3}{4}\right) \frac{4}{3}x = 8 \left(\frac{3}{4}\right) \\ x = 6 \end{array}$$

$$\begin{array}{r} 5. 5y - 2 = 28 - y \\ +y \quad +2 \quad +2 \quad +y \\ \hline 6y = 30 \\ y = 5 \end{array}$$

$$\begin{array}{r} 6. 5 - 2x = 3x - 7x + 25 \\ 5 - 2x = -4x + 25 \\ -5 + 4x \quad +4x \quad -5 \\ \hline 2x = 20 \\ x = 10 \end{array}$$

$$\begin{array}{r} 7. \left(\frac{2}{3} + \frac{1}{4}t\right) = \frac{1}{3} \cdot 12 \\ 8 + 3t = 4 \\ -8 \quad -8 \\ \hline 3t = -4 \\ t = -\frac{4}{3} \end{array}$$

$$\begin{array}{r} 8. \left(\frac{7}{8}x - \frac{1}{4} + \frac{3}{4}x\right) = \left(\frac{1}{16} + x\right) \cdot 16 \\ 14x - 4 + 12x = 1 + 16x \\ 26x - 4 = 1 + 16x \\ -16x \quad -4 \quad -1 \quad +16x \\ \hline 10x = 5 \quad x = \frac{1}{2} \end{array}$$

$$\begin{array}{r} 9. 3(2y - 3) = 27 \\ 6y - 9 = 27 \\ +9 \quad +9 \\ \hline 6y = 36 \\ y = 6 \end{array}$$

$$\begin{array}{r} 10. 2(3 + 4m) - 9 = 45 \\ +9 \quad +9 \\ \hline -6 + 8m = 54 \\ -6 \quad -6 \\ \hline 8m = 48 \\ m = 6 \end{array}$$

$$\begin{array}{r} 11. 6 - 2(3x - 1) = 2 \\ 6 - 6x + 2 = 2 \\ 8 - 6x = 2 \\ -8 \quad -8 \\ \hline -6x = -6 \\ x = 1 \end{array}$$

$$\begin{array}{r} 12. 6b = (3b + 8) + 16 \\ 6b = 3b + 24 \\ -3b \quad -3b \\ \hline 3b = 24 \\ b = 8 \end{array}$$

$$\begin{array}{r} 13. \sqrt{x} + 3 = 5 \\ -3 \quad -3 \\ \hline \sqrt{x} = 2 \\ x = 4 \end{array}$$

check!

$$\begin{array}{r} 14. \sqrt{2x+1} = 13 \quad \text{check!} \\ 2x+1 = 169 \\ -1 \quad -1 \\ \hline 2x = 168 \\ x = 84 \end{array}$$

$$\begin{array}{r} 15. 3 + \sqrt{x-1} = 5 \quad \text{check!} \\ -3 \quad -3 \\ \hline \sqrt{x-1} = 2 \\ x-1 = 4 \\ +1 \quad +1 \\ \hline x = 5 \end{array}$$

$$\begin{array}{r} 16. 6 - 2\sqrt{3n} = 0 \\ -2\sqrt{3n} = -6 \\ -2 \quad -2 \\ \hline \sqrt{3n} = 3 \\ 3n = 9 \\ 3n = 9 \\ \hline n = 3 \end{array}$$

check

$$\begin{array}{r} 17. \sqrt{x} + 9 = 2 \\ -9 \quad -9 \\ \hline \sqrt{x} = -7 \\ \text{no real solution} \end{array}$$

$$\begin{array}{r} 18. \sqrt{2y+6} = \sqrt{2y-5} \\ 2y+6 = 2y-5 \\ 6 = -5 \quad \text{no solution} \end{array}$$

$$\begin{array}{r} 19. |k - 10| = 3 \\ k - 10 = -3 \quad k - 10 = 3 \\ +10 \quad +10 \quad +10 \quad +10 \\ \hline k = 7 \quad k = 13 \end{array}$$

$$\begin{array}{r} 20. |m| + 2 = 10 \\ -2 \quad -2 \\ \hline |m| = 8 \\ m = -8 \quad m = 8 \end{array}$$

$$\begin{array}{r} 21. -2|x+3| = -10 \\ |x+3| = 5 \\ x+3 = -5 \quad x+3 = 5 \\ -3 \quad -3 \quad -3 \quad -3 \\ \hline x = -8 \quad x = 2 \end{array}$$

$$22. \frac{3}{3}|x+5| = \frac{-6}{3}$$

$$|x+5| = -2$$

no solution

$$25. x+6 \leq 2$$

$$-6 \quad -6$$

$$x \leq -4$$



$$28. -5x \geq \frac{1}{4}(-\frac{1}{5})$$

$$-5$$

$$x \leq -\frac{1}{20}$$



$$31. \frac{2}{3}(2x-1)$$

$$x = -11 \quad x = 6$$

$$23. 2 - |2x+5| = -15$$

$$-2 \quad -2$$

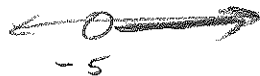
$$-|2x+5| = -17$$

$$|2x+5| = 17$$

$$2x+5 = 17 \quad 2x+5 = -17$$

$$2x = 12 \quad 2x = -22$$

$$x = 6 \quad x = -11$$



$$29. 5 - 9x \geq 19 + 5x$$

$$-19 + 9x \quad -19 + 9x$$

$$-14 \geq 14x$$

$$14x \leq -14$$

$$x \leq -1$$



$$32. -9 < 6x+3 \leq 39$$

$$-3 \quad -3 \quad -3$$

$$-12 < 6x \leq 36$$

$$\frac{-12}{6} < \frac{6x}{6} \leq \frac{36}{6}$$

$$-2 < x \leq 6$$



$$24. 4|3x| - 5 = -1$$

$$+5 \quad +5$$

$$4|3x| = 4$$

$$|3x| = 1$$

$$3x = 1 \quad 3x = -1$$

$$x = \frac{1}{3} \quad x = -\frac{1}{3}$$



$$30. \frac{2}{3}x + 6 > 4$$

$$-6 \quad -6$$

$$\frac{2}{3}x > -2$$

$$(\frac{3}{2}) \cdot \frac{2}{3}x > \frac{3}{2} \cdot (-2)$$

$$x > -3$$



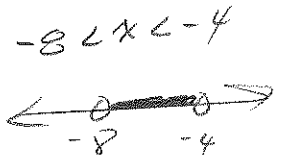
$$33. 17 < 5 - 3x < 29$$

$$-5 \quad -5 \quad -5$$

$$12 < -3x < 24$$

$$\frac{12}{-3} < \frac{-3x}{-3} < \frac{24}{-3}$$

$$-4 > x > -8$$

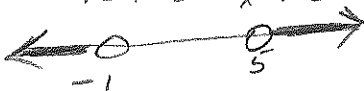


$$34. 8 + 2x < 6 \text{ or } 3x - 2 > 13$$

$$-8 \quad -8 \quad +2 \quad +2$$

$$2x < -2 \quad 3x > 15$$

$$x < -1 \text{ or } x > 5$$

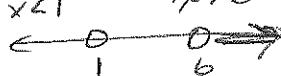


$$35. 3x+1 < 4 \text{ or } 2x-5 > 7$$

$$-1 \quad -1 \quad +5 \quad +5$$

$$3x < 3 \text{ or } 2x > 12$$

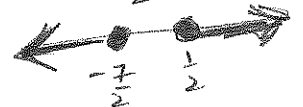
$$x < 1 \text{ or } x > 6$$



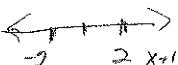
$$\#37 \quad x < 13 \text{ or } x > 23$$



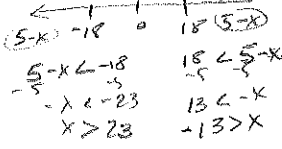
$$\#38 \quad x < -\frac{7}{2} \text{ or } x > \frac{1}{2}$$



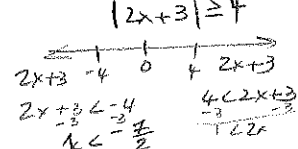
$$36. |x+1| \geq 2$$



$$37. |5-x| > 18$$



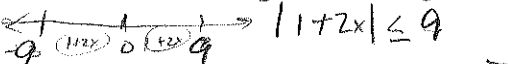
$$38. 2|2x+3| \geq 8$$



$$39. -3|1+2x| \geq -27$$

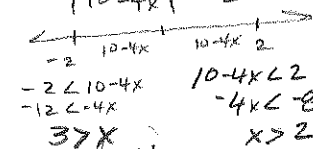
$$-3 \quad -3$$

$$|1+2x| \leq 9$$



$$40. |10-4x| + 5 < 7$$

$$|10-4x| < 2$$



$$41. |x - \frac{1}{2}| \leq \frac{3}{2}$$



$$\#40$$

$$2 < x < 3$$



$$\#41$$

$$-1 \leq x \leq 2$$



$$42. E = mc^2, c^2$$

$$\frac{E}{m} = c^2$$

$$43. Q = \frac{ctd}{2}, d$$

$$2Q = c \cdot d$$

$$2Q - c = d$$

$$44. v = \frac{3k}{t}, t$$

$$tv = 3k$$

$$t = \frac{3k}{v}$$

45. $Ax + By = C$, y

$$By = -Ax + C$$

$$y = \frac{-A}{B}x + \frac{C}{B}$$

46. $A = \frac{1}{2}ah - \frac{1}{2}bh$, h

$$A = \frac{1}{2}h(a-b)$$

$$2A = h(a-b)$$

$$\frac{2A}{a-b} = h$$

47. $P = \frac{ab}{c}$, c

$$cP = ab$$

$$c = \frac{ab}{P}$$

48. $y = x + 2$

$y = \frac{1}{2}x + 4$ solve by graphing

49. $y + 2x = 6$

$y = -x + 2$ solve by graphing

50. $5y + x = 6$

$x = y + 3$ solve by substitution

$$5y + y + 3 = 6$$

$$6y + 3 = 6$$

$$6y = 3$$

$$\left(\frac{7}{2}, \frac{1}{2} \right)$$

$$y = \frac{1}{2}$$

$$x = \frac{7}{2}$$

51. $2x + 5y = 4$

$x + 5y = 7$ solve by substitution

$$2(-5y + 7) + 5y = 4$$

$$-10y + 14 + 5y = 4$$

$$-5y = -10$$

$$y = 2$$

$$x = -10 + 7 = -3$$

$$(-3, 2)$$

52. $4x + y = 2$

$x - y = -17$ solve by elimination

$$5x = -15$$

$$x = -3$$

$$-12 + y = 2$$

$$y = 14$$

$$(-3, 14)$$

53. $3x + 2y = 8$

$-3(x + 4y = -4)$ solve by elimination

$$-3x + 2y = 8$$

$$-3x - 12y = 12$$

$$-10y = 20$$

$$y = -2$$

$$(4, -2)$$

Part 2 Miscellaneous

54. write an inequality for the graph shown:



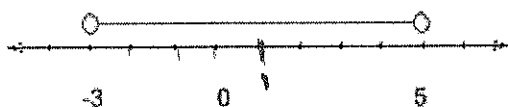
$$x \leq -4$$

55. write an inequality for the graph shown:



$$x < -1 \text{ or } x > 6$$

56. write an absolute value inequality for the graph shown:



$$|x - 1| < 4$$

57. A 72 inch board is cut into 2 pieces. One piece is twice as long as the other. How long are the pieces?

Let $x = 1^{\text{st}} \text{ piece}$
 $2x = 2^{\text{nd}} \text{ piece}$

$$\begin{aligned}x + 2x &= 72 \\3x &= 72 \\x &= 24\end{aligned}$$

1st piece is 24 inches
 2nd piece is 48 inches

58. The state of Colorado is the shape of a rectangle whose perimeter is 1300 miles. The length is 110 miles more than the width. Find the dimensions.

Let $w = \text{width}$
 $w + 110 = \text{length}$

$$\begin{aligned}2w + 2(w + 110) &= 1300 \\2w + 2w + 220 &= 1300 \\4w + 220 &= 1300 \\4w &= 1080\end{aligned}$$

$w = 270$ The width is 270 miles
 And the length is 380 miles

59. Acme Rent-A-Car rents an intermediate-size car at a daily rate of \$44.95 plus \$0.29 per mile. A salesperson can spend no more than \$100 per day on a car rental. What is the maximum number of miles the salesperson can drive?

Let $C = \text{cost of rental}$
 $m = \# \text{ miles}$

$$\begin{aligned}C &\leq 100 \\C &\leq 0.29m + 44.95 \\100 &\leq 0.29m + 44.95\end{aligned}$$

60. The sum of two numbers is 27. One number is three more than the other number. Find the two numbers by setting up and solving a system of equations.

Let $x = 1^{\text{st}} \#$
 $y = 2^{\text{nd}}$

$$\begin{aligned}y &= x + 3 \\x + y &= 27\end{aligned}$$

$$\begin{aligned}x + x + 3 &= 27 \\2x + 3 &= 27 \\2x &= 24\end{aligned}$$

$$x = 12 \quad y = 15$$

61. A collection of quarters and nickels is worth \$1.25. There are 13 coins in all. How many of each are there. Set up and solve a system to answer the question.

Let $q = \# \text{ quarters}$
 $n = \# \text{ nickels}$

$$\begin{aligned}q + n &= 13 \\0.25q + 0.05n &= 1.25\end{aligned}$$

62. There were 429 people at a play. Admission was \$1 for each adult and \$.75 for each child. The receipts were \$372.50. Set up and solve a system to find how many children and how many adults attended.

Let $c = \# \text{ children}$
 $a = \# \text{ adults}$

$$\begin{aligned}c + a &= 429 \\0.75c + a &= 372.50\end{aligned}$$

Part 3 Exponents: Use only positive exponents to simplify.

$$63. \frac{5x^3}{15x^6} = \frac{1}{3x^3}$$

$$64. \frac{25x^3y^4}{15xy^2} = \frac{5x^2y^2}{3}$$

$$65. \frac{11a^3b^{-5}c^7}{121a^5b^{-10}c^8} = \frac{11a^3b^{10}c^7}{121a^5b^5c^8} = \frac{b^5}{11a^2c}$$

$$66. 8^{-2}$$

$$\frac{1}{8^2} = \frac{1}{64}$$

$$67. -5^{-2}$$

$$-\frac{1}{25}$$

$$68. -3^4$$

$$-\frac{1}{81}$$

$$69. \left(\frac{3}{2}\right)^{-3} = \left(\frac{2}{3}\right)^3$$

$$\frac{8}{27}$$

Part 4 Polynomials and Factoring: Perform the indicated operation (#70-79) or factor (#80-88)

$$70. (3x+6) + (2x-4)$$

$$3x+6+2x-4$$

$$\boxed{5x+2}$$

$$71. (3x^2+6x-4) - (-2x^2-7x-5)$$

$$3x^2+6x-4+2x^2+7x+5$$

$$\boxed{5x^2+13x+1}$$

$$72. (x^4+3x^3-x+7) + (2x^5-3x^4+x-5)$$

$$\boxed{2x^5-2x^4+3x^3+2}$$

$$73. (x^3+3x^2-4) - (-2x^2-7x-5)$$

$$x^3+3x^2-4+2x^2+7x+5$$

$$\boxed{x^3+5x^2+7x+1}$$

$$74. 3(4x-7)$$

$$\boxed{12x-21}$$

$$75. (3x+1)^2$$

$$\begin{array}{l} (3x+1)(3x+1) \\ \hline 9x^2+6x+1 \end{array}$$

$$76. (x + \frac{1}{2})(x - \frac{1}{2})$$

$$\boxed{x^2 - \frac{1}{4}}$$

$$77. (2y+5)(2y-5)$$

$$\boxed{4y^2-25}$$

$$78. (2x-9)(3x+4)$$

$$\begin{array}{l} 6x^2+8x-27x-36 \\ \hline 6x^2-19x-36 \end{array}$$

$$79. (3p+q)(5p-2q)$$

$$\begin{array}{l} 15p^2-6pq+5pq-2q^2 \\ \hline 15p^2-pq-2q^2 \end{array}$$

80. $x^2 - 3x$

$$x(x-3)$$

81. $9x^2 - 4$

$$(3x+2)(3x-2)$$

82. $x^2 + 4x - 12$

$$(x+6)(x-2)$$

83. $x^3 + x^2 + 3x + 3$

$$x^2(x+1) + 3(x+1)$$

$$(x^2+3)(x+1)$$

84. $2x^2 - 50$

$$2(x^2-25)$$

$$2(x+5)(x-5)$$

85. $x^4 - 81$

$$(x^2+9)(x^2-9)$$

$$(x^2+9)(x+3)(x-3)$$

86. $6x^2 - 28x - 48$

$$2(3x^2 - 14x - 24)$$

$$2(3x+4)(x-6)$$

87. $2x^2 - 7x - 4$

$$(2x+1)(x-4)$$

88. $25x^2 - 20x + 4$

$$(5x-2)(5x+2)$$

Part V Zero Product Property. Solve each quadratic using the zero product property.

89. $(x-7)(2x+1)=0$

$$x=7 \quad x=-\frac{1}{2}$$

90. $2x(x-9)=0$

$$x=0 \quad x=9$$

91. $2x^2 - 10x + 8 = 0$

$$2(x^2 - 5x + 4) = 0$$

$$2(x-4)(x-1) = 0$$

$$x=4 \quad x=1$$

93. $x^2 = 17x - 72$

$$x^2 - 17x + 72 = 0$$

$$(x-8)(x-9) = 0$$

$$x=8 \quad x=9$$

95. $6x^2 + 7x - 3 = 0$

$$(2x+3)(3x-1) = 0$$

$$x = -\frac{3}{2} \quad x = \frac{1}{3}$$

92. $3x^2 + 5x - 2 = 0$

$$(3x-1)(x+2) = 0$$

$$x = \frac{1}{3} \quad x = -2$$

94. $3x^2 - 10x + 8 = 0$

$$(3x-4)(x-2) = 0$$

$$x = \frac{4}{3} \quad x = 2$$

96. $2x^2 + 9x - 5 = 0$

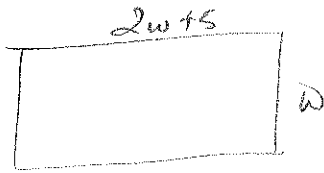
$$2x^2 + 9x - 5 = 0$$

$$(2x-1)(x+5) = 0$$

$$x = \frac{1}{2} \quad x = -5$$

97. The area of the rectangular playground is 250 square yards. The length is 5 more than twice the width. What are the dimensions of the playground.

let $w = \text{width}$ $A = l \cdot w$
 $2w + 5 = \text{length}$



$$250 = w(2w + 5)$$

$$250 = 2w^2 + 5w$$

$$0 = 2w^2 + 5w - 250$$

$$0 = (2w + 25)(w - 10)$$

$$w = \frac{-25}{2} \quad w = 10$$

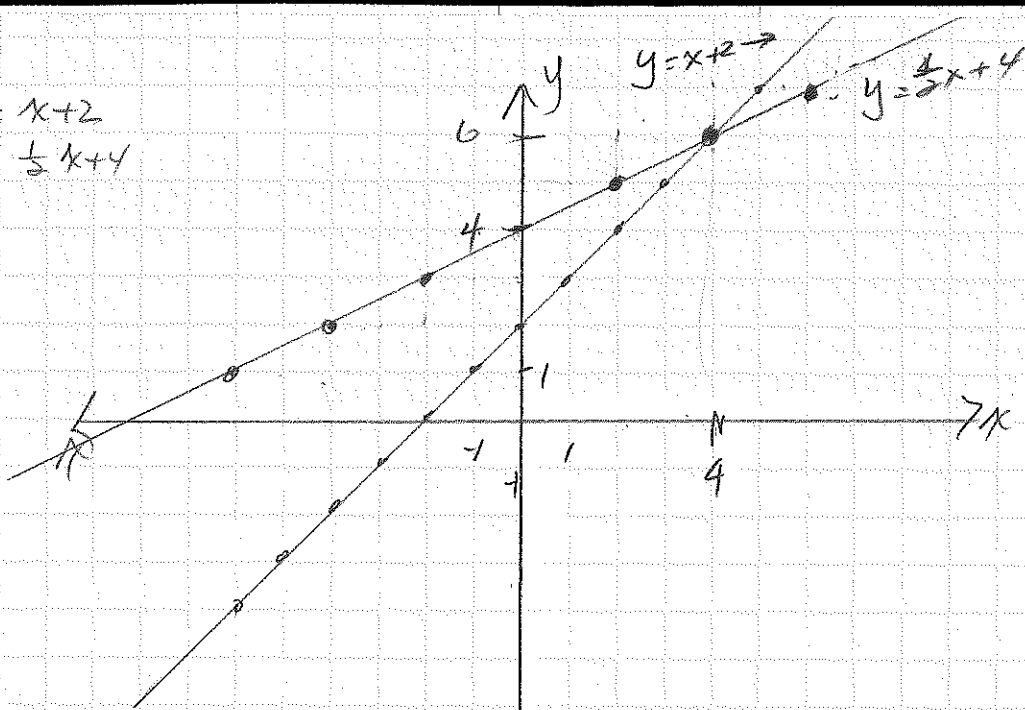
The width is 10 yds and the length is 25 yds.

48

$$y = x + 2$$

$$y = \frac{1}{2}x + 4$$

(4, 6)



49)

$$y + 2x = 6$$

$$y = -x + 2$$

$$y = -2x + 6$$

(4, -2)

